The relationship between leadership style, organisational climate, innovation and organisational performance: An investigation into research methodology used

Understanding the impact of leadership style, organisational climate and innovation on organisational performance is important for organisations in order to sustain competitive advantage. However, building an empirical base is hampered by a lack of uniformity in the methods used to study the relationship between these constructs. This article reports on the methods used in empirical studies to investigate the relationship between leadership style, innovation and organisational performance on the one hand and organisational climate, innovation and organisational performance on the other hand. This report provides the necessary structure for future researchers to build on the present body of knowledge using the same or complementary methodologies when creating new knowledge. A framework based on methodological literature has been designed to analyse journal articles that investigate the relationship between the above-mentioned four constructs. Articles to be analysed were identified by using the systematic literature review methodology.

After consulting 31 research databases, only 1 article that investigated the relationship between all four constructs was identified. Thirteen articles included three of the four variables. It was found that, in many cases, authors were not diligent in reporting the methods applied in the research. The findings reveal, however, that the quantitative approach is by far the most preferred design, and the Structural Equation Model (SEM) is the most favoured technique used to analyse data. This research provides a basis for future researchers to add to the body of knowledge. It is recommended that researchers pay greater attention to reporting the methods used as this will enhance the replication of their work. This article provides researchers with a clear picture of how research is conducted in this area, informs them of the shortcomings of present research and identifies the challenges or shortcomings that have been identified by previous researchers.

**Introduction**

Innovation in organisations is positively and significantly related to superior organisational performance (UI Hassan et al. 2013; Yang, Yang & Chen 2014; Yu-Fang 2013). Organisational performance can be classified into two categories, namely, financial and non-financial (Shin et al. 2015). Bearing this in mind, a growing body of literature presents innovation as a key driver of sustainable competitive advantage (Al-Husseini & Elbeltagi 2012; Chalhoub 2010; Sarros & Cooper 2011). Important to this relationship are organisational climate and the role of leadership. The literature shows that the leadership style of senior management has a strong impact on organisational climate with regard to innovativeness and the performance of the organisation (UI Hassan et al. 2013). Similarly, a stream of research has demonstrated that organisational climate plays an important role in the relationship between innovation and organisational performance (Isaksen & Ákkermans 2011).

Studying these relationships in isolation may lead to an ineffective approach being adopted. For instance, studying leadership and innovation without including organisational climate and performance may result in leaders channelling their energies towards developing a culture of innovation by focusing on only using the appropriate style of leadership. This is a consequence of the lack of understanding of the influence of organisational climate on the relationship between leadership style and organisational performance. Similarly, the exclusion of organisational performance presents a challenge whereby leaders are assured of the type of leadership style that will positively influence innovation. However, they are not sure if the improved level of innovation...
will ultimately lead to improved organisational performance, and, because of poor understanding of these strategic variables, organisations may fail to achieve sustainable competitive advantage.

The debate on the nature of the aforementioned relationship is still in its early stages, and the methods appropriate to the empirical investigation of this relationship are not clearly defined. In this article, the aim is to report on and critically evaluate the methods used to study the relationship between leadership style, organisational climate, innovation and organisational performance. This is done against the backdrop of standard or traditional methods used in business research. This report will thus inform future researchers about standard practices in such research as well as highlighting the possible pitfalls.

Importance of the research

The importance of understanding the relationship between leadership style, organisational climate, innovation and organisational performance was introduced above. Although some research has been conducted in this field, the findings were inconclusive, with some studies (Likar, Kopac & Fatur 2014; UI Hassan et al. 2013; Yang et al. 2014) showing a positive relationship, whilst others (Forsman & Temel 2011; Kannebley, Sekkel & Araújo 2008; Koellinger 2008; Martin, Baby & Banga 2012) showed no relationship. Rubera and Kirca (2012) point out a number of possible reasons for these unconvincing findings, which include, *inter alia*, the methodology used to conduct the study. It is therefore important for the advancement of the field to adopt research strategies based on previous research. This article aims to provide a structure for how research in this area should be undertaken by future researchers to draw on and to provide information about the challenges identified by earlier researchers.

Literature review

The literature review defines the four constructs that are the focus of this article and delineates the manner in which reporting on research methods is done. This is followed by a brief description of what the standard research method structure entails.

Leadership style

Leadership entails mastering three critical management skills that should be practised consciously, namely, (1) strategic thinking skills, (2) innovative thinking skills and (3) situation management skills (Wilkins & Carolin 2013). The three fundamental skills may require leaders to adopt different leadership styles, depending on the circumstances. For instance, in transactional leadership theory, compensation is regarded as a motivating factor for employees (Golla & Johnson 2013; Yukl 2010) and revolves around an exchange involving the trade of goods or services. In contrast, the influence of transformational leaders does not stem from exchange benefits, but from the logical result of a complex cluster of behaviours and techniques (Swanepoel et al. 2003). At the heart of transformational leadership theory is the basic belief that a leader needs to articulate a clearly defined vision to transform the organisation and energise followers to adopt a new paradigm by appealing to issues that are fundamental to their existence (Eustace & Martins 2014). Research has demonstrated that transactional leadership is suitable when the goal is to instil a culture of innovation (Golla & Johnson 2013), whereas transformational leadership is more suitable when the goal is to articulate and communicate a coherent vision and strategy to the organisation (Wilkins & Carolin 2013; Yang et al. 2014).

Organisational climate

According to Pirola-Merlo et al. (2002), organisational climate refers to a set of norms, attitudes and expectations that individuals perceive to operate in a particular social context. As such, organisational climate can be defined as a set of characteristics of an organisation's internal environment that are influenced by its policies and practices (Zhang & Begley 2011). It is in this context that Chang, Chuang and Bennington (2011) argue that organisational climate conveys a message about the life within the organisation and serves to uphold and perpetuate a particular view of reality shared by members of the organisation. In other words, organisational climate is constituted by recurrent patterns of behaviour, attitudes and feelings that characterise life in the organisation (Björkdahl & Börjesson 2011).

Innovation

The term ‘innovation’ is defined within the organisational context as the ‘management of all the activities involved in the process of idea generation, technology development, manufacturing and marketing of the new or improved product, process or equipment’ (Trott 2012:23). Innovation can be incremental or radical. Incremental innovation is based on extending existing technologies and improving features of existing products, services and processes, whereas radical innovation is about creating dramatic change in technology, processes, products or services and ultimately transforming the existing markets and industry, or giving rise to new markets (Miller, Miller & Dismukes 2005). Radical innovations are generally considered to be risky as they require time, financial resources and expensive knowledge (Cainelli, Evangelista & Savona 2006). It is in this context that Jenssen and Åsheim (2010) emphasise the importance of distinguishing between different typologies of innovation because this helps to identify the antecedents of innovation.

Organisational performance

The concept of organisational performance is central to the understanding of organisational success and the elements responsible for that variation (Hoopes, Hadsen & Walker 2003). It is important to note that scholars who embark on empirical studies often employ a number of different measures to evaluate financial performance (Berger & Bonaccorsi di Patti 2006), whilst others go further and include
non-financial performance, such as job satisfaction, productivity and market share (Battor & Battor 2010; Huang et al. 2012). To assess financial performance most scholars prefer to use accounting measures such as return on assets (ROA), return on equity (ROE), return on investment (ROI), profitability and sales growth (Cho & Pucik 2005). Similarly, Tobin’s Q is considered by many scholars as the de facto standard with regard to market-related measures (Karanja 2011). The combination of both financial and non-financial measures is viewed by many as the most effective measure of organisational performance. Nonetheless, the exclusive use of either financial or non-financial measures of organisational performance is not implicitly wrong, provided that researchers clearly define which aspects of organisational performance they intend to study (Gentry & Shen 2010). In this study, organisational performance refers to both financial and non-financial performance.

Research method structure

An analysis of the literature on the structuring of a method section of an academic article, reveals repeated inclusion of the following elements, which include subsections such as the research paradigm, research design, sampling, measurements, validity and reliability, data collection, data analysis and interpretation, limitations and ethical considerations (APA 2011; Fabio et al. 2012; Hofstee 2011; Leedy & Ormrod 2005; Mouton 2013; Saunders 2012). The remainder of the literature review is dedicated to explaining these subsections and should guide authors on what should be reported on in a methodology section.

Research paradigm

A paradigm refers to the entire constellation of beliefs, values and techniques shared by members of a given community (Kuhn 1970). At an abstract level, there are two major concerns when thinking about research philosophy or paradigm, namely, ontology and epistemology. Ontology is concerned with the nature of reality (Saunders 2012). In other words, researchers take a position regarding their perceptions of how things are and how things work (Scotland 2012). Conversely, epistemology concerns what constitutes acceptable knowledge in the field of study (Saunders 2012), in other words, what it means to know (Scotland 2012). As a result, every paradigm is based on its own ontological and epistemological assumptions.

Positivism is a common stance in business research and many textbooks in the field refer to this paradigm (Mouton 2013; Olivier 2004; Saunders 2012). According to Creswell (2009), positivists attempt to identify causes which influence outcomes. The ontological position of positivism is the one that assumes that objects have an existence independently of the researcher (Cohen, Manion & Morrison 2007). Furthermore, the positivist epistemology suggests that meaning solely resides in objects, rather than the conscience of the researcher, with the intention of acquiring the meaning (Scotland 2012). It could be expected that a well-written article makes some kind of declaration on the research paradigm.

Research design

Typically, the research design section begins with a general paragraph describing the study design (Azevedo et al. 2011). According to Hofstee (2011), the research design section is where the overall approach to testing the research question or statement is discussed. There, typology of the research design can be classified into two categories, namely, empirical studies and non-empirical studies (Mouton 2013). Empirical studies derive new knowledge from data, whereas non-empirical studies use the literature review, modelling and the philosophical and conceptual analysis to develop new knowledge. Empirical studies can be qualitative, quantitative or mixed. Non-empirical studies are generally qualitative in nature. According to Marais (2012), qualitative research approaches the phenomena from the perspective of the subject in order to understand the phenomena in their context. In contrast, quantitative research approaches the phenomena from the perspective of the outsider, with the aim to explain and predict the phenomena under study in isolation (Marais 2012). Providing a concise declaration on the design of the research would enable the replication of the conducted research and building on exciting knowledge.

Sampling

A sample is part of something larger, called a population or universe (Diamantopoulos & Schlegelmilch 2000). Sampling procedure describes the procedure for selecting the participants or sample from the population (APA 2011). When selecting a sample from the target population, probabilistic sampling methods (random) are preferred as they guarantee representativeness of the sample (Azevedo et al. 2011). On the other hand, although non-probabilistic sampling methods such as convenient and conservative systematic sampling do not guarantee representativeness of the sample, they are more common, and they do not necessarily prevent researchers from validly answering the research question (Azevedo et al. 2011). Having knowledge about the sampling followed in previous research projects could guide prospective researchers to select appropriate sample sizes and inform them of what populations are commonly targeted in a particular field of study.

Instruments measurements, validity and reliability

The process of measurement can be regarded as the assignment of symbols to characteristics of persons, objects or states of events according to certain rules (Diamantopoulos & Schlegelmilch 2000). Researchers can therefore either adopt existing instruments or develop their own instruments. To allow replication of the study, the assessment instruments (measurements) should be described in clear detail. In the same vein, the validity and the reliability of the measurements used in the study should also be described in detail (Fabio et al. 2012). Validity refers to how well the research model investigates (1) what it intends to investigate and (2) to what extent the researcher gains access to the informant’s knowledge and meaning. On the other hand, reliability refers to the consistency and stability of the measurement process (Lee 1999). In other words, reliability
is concerned with researchers clearly demonstrating that they have not invented or misrepresented the data collected, and the research can be repeated under the same conditions with approximately the same outcomes (Hofstee 2011). Being in possession of knowledge related to the instruments used by previous researchers would enable researchers to select the most appropriate instruments for their own use and allow them to build on the base set provided by previous researchers.

Data analysis and interpretation

Data analysis and interpretation can be viewed as three concurrent flows of activity, namely, (1) data reduction, (2) data display and (3) the conclusion deduced from the data (Miles & Huberman 1994). According to Hofstee (2011), if the research follows a quantitative design, then the statistical analysis techniques must be described in this section. For instance, when reporting inferential statistics, test values, degrees of freedom, probability values and effect sizes should be reported (Fabio et al. 2012). Most importantly, for inferential statistics, the decision techniques on the interpretation of the results should be determined prior to the data analysis (Diamantopoulos & Schlegelmilch 2000). In fact, Diamantopoulos and Schlegelmilch (2000) go even further and argue that it is not legitimate to change the level of significance retrospectively (i.e. from 0.05 to 0.01), given that the results of the data change or might change based on the significance level.

If the research is qualitative in nature, equally, the researcher should explain how the data are analysed (Hofstee 2011). In qualitative research, the researcher’s own assumptions, bias and subjectivity should be stated upfront (Fabio et al. 2012). Ultimately, the primary aim of the analysis is to understand the various constitutive elements of one’s data through the inspection of the relationship between concepts, constructs or variables, whereas the interpretation involves the synthesis of data into larger coherent wholes (Mouton 2013).

Should prospective researchers examine the work of other researchers in the field, their customs regarding analytical techniques as well as the decision rules they apply will become apparent. This will allow for comparison between studies and building a solid base of knowledge on the topic.

Limitations

The primary purpose of research is to discover the truth (Saunders 2012). However, all methods have some limitations (Hofstee 2011). Therefore, it is advisable to acknowledge the limitations of the research and provide explanations on why the results still validly answer the research question (APA 2011). In fact, according to Diamantopoulos and Schlegelmilch (2000) it is advantageous to be open and frank about limitations inherent to the research study rather than leaving them to the reader to discover. This kind of knowledge is of particular value to prospective researchers as pitfalls and suggestions for improving research are presented here.

Ethical considerations

Whenever human beings or other creatures with a potential to think, feel and experience physical or psychological distress are the focus of investigation, the ethical implications of what the researcher intends doing must be observed very closely (Leedy & Ormrod 2005). As such, this section is intended to describe in detail what the researcher has done to ensure that the study adheres to ethical guidelines (Hofstee 2011). Research ethics, however, go beyond the protection of human subjects and include elements such as deception in research, permission to use copyrighted material included in the research and permission to use unpublished instruments. It also includes honesty with professional colleagues, such as reporting the findings in a complete and honest fashion without misrepresenting the data or intentionally misleading others about the nature of the findings (APA 2011; Leedy & Ormrod 2005). An analysis of the ethical considerations of those who have published their research can guide aspiring researchers to do their investigations and reports in line with academic standards.

The aforementioned structure should allow researchers to provide essential information on how to make sound and justifiable judgements about the validity of the results and conclusions derived from the study (Azevedo et al. 2011).

Method

This study adopted two generic steps of the systematic literature review methodology, namely (1) a search of the literature and (2) selection of relevant studies by applying inclusion and exclusion criteria. The primary aims of this review were to analyse the methods used in prior studies to investigate the relationship between leadership style, organisational climate, innovation and organisational performance, and to identify emergent themes based on the list of subsections presented in the literature review.

The keywords ‘leadership’ (leaders*) or ‘climate’ (climate*) were used in conjunction with ‘innovation’ (innov*; creative*) and ‘performance’ (perform*; finance*; outp*; return*) in the search for published articles. The options (criteria) selected for the search were full-text, peer-reviewed and scholarly journals. Two major academic databases, namely EBSCOhost and ProQuest, were searched. For articles to be included in the analysis, they needed to include all four variables, or leadership with both innovation and organisational performance, or climate with both innovation and organisational performance.

On EBSCOhost, 21 databases (Table 1 in Appendix 1) were searched and 17 articles were retrieved. On ProQuest, 1010 databases (Table 2 in Appendix 1) were searched and 14 articles were retrieved. In both cases, the search was not limited to a specific time period. In total, 31 articles were retrieved from both EBSCOhost and ProQuest. However, 7 duplicate articles were identified, resulting in 24 distinct articles retrieved from the search. The abstracts of articles
that met the first level of inclusion criteria were analysed in order to identify those studies that treat leadership style and/or organisational climate as well as innovation and organisational performance as variables.

Validity was addressed by applying an extensive and exhaustive search strategy and applying appropriate selection criteria for the identification of articles. To enhance the reliability of the search, both the author and co-author were involved in decision-making regarding the inclusion and exclusion criteria. In total 14 articles, as presented in Table 1, met these criteria.

The fact that only 14 articles met the inclusion criteria suggests that few studies are designed to trace the effect of innovation on organisational performance by examining the influence of leadership style and/or organisational climate. Interest in this topic seems to be of a contemporary matter, as only 2 of the 14 articles identified were older than 10 years and 7 were published less than 5 years ago.

**Findings**

One study (Article 8) included all four variables: leadership style, organisational climate, innovation and organisational performance. The rest of the studies included only three variables. Seven studies (Articles 1, 4, 5, 6, 10, 12 and 13) included leadership style, innovation and organisational performance, whereas six studies (Articles 2, 3, 7, 9, 11 and 14) included organisational climate, innovation and organisational performance. For the sake of clarity, a summary of the findings is presented in Appendix 1, Table 3.

By academic standards, the number of articles that met the inclusion criteria seems to be very small, given that a search with ‘leadership’ and ‘innovation’ delivered 377 articles from EBSCOhost and 161 articles from ProQuest. Furthermore, when the keywords ‘innovation’ and ‘performance’ were used, 843 articles were retrieved from EBSCOhost and 361 articles from ProQuest. When the keywords ‘climate’ and ‘innovation’ were used, 255 articles were retrieved from EBSCOhost and 54 articles from ProQuest. It is thus not that the variables do not exist in the academic domain, but the particular grouping of the variables used for this study is limited.

The articles that met the inclusion criteria were analysed according to the methodology subsections identified in the literature review (see ‘Research method structure’). The findings are presented below.

**TABLE 1: Articles that investigate leadership styles, organisational climate, innovation and organisational performance.**

<table>
<thead>
<tr>
<th>Article</th>
<th>Year</th>
<th>Author(s)</th>
<th>Title</th>
<th>Journal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1993</td>
<td>Howell &amp; Avolio</td>
<td>Transformational leadership, transactional leadership, locus of control and support for innovation: Key predictors of consolidated-business-unit performance</td>
<td>Journal of Applied Psychology</td>
</tr>
<tr>
<td>2</td>
<td>2003</td>
<td>Baer &amp; Frese</td>
<td>Innovation is not enough: Climates for initiative and psychological safety, process, innovations, and firm performance</td>
<td>Journal of Organisational Behavior</td>
</tr>
<tr>
<td>3</td>
<td>2008</td>
<td>Crespell &amp; Hansen</td>
<td>Work climate, innovativeness, and firm performance in the US forest sector: In search of a conceptual framework</td>
<td>Canadian Journal of Forest Research</td>
</tr>
<tr>
<td>4</td>
<td>2008</td>
<td>García-Morales, Lloréns-Montes &amp; Verdú-Jove</td>
<td>The effects of transformational leadership on organisational performance through knowledge and innovation</td>
<td>British Journal of Management</td>
</tr>
<tr>
<td>5</td>
<td>2008</td>
<td>García-Morales, Mattas-Reche &amp; Hurtado-Torres</td>
<td>Influence of transformational leadership on organisational innovation and performance depending on the level of organisational learning in the pharmaceutical sector</td>
<td>Journal of Organisational Change Management</td>
</tr>
<tr>
<td>6</td>
<td>2008</td>
<td>Matzler et al.</td>
<td>The relationship between transformational leadership, product innovation and performance in SMEs</td>
<td>Journal of Small Business and Entrepreneurship</td>
</tr>
<tr>
<td>7</td>
<td>2008</td>
<td>Panuwatwanich, Steward &amp; Mohamed</td>
<td>The role of climate for innovation in enhancing business performance</td>
<td>Engineering Construction and Architectural Management</td>
</tr>
<tr>
<td>8</td>
<td>2010</td>
<td>Charbonnier-Voirin, El Akremi &amp; Vandenberghie</td>
<td>A multilevel model for transformational leadership and adaptive performance and the moderating role of climate for innovation</td>
<td>Group and Organisation Management</td>
</tr>
<tr>
<td>10</td>
<td>2012</td>
<td>Overstreet et al.</td>
<td>Leadership style and organisational innovativeness drive motor carriers toward sustained performance</td>
<td>The International Journal of Logistics Management</td>
</tr>
<tr>
<td>11</td>
<td>2013</td>
<td>Choi, Moon &amp; Ko</td>
<td>An organisation’s ethical climate, innovation, and performance effects of support for innovation and performance evaluation</td>
<td>Management Decision</td>
</tr>
<tr>
<td>12</td>
<td>2013</td>
<td>Golla &amp; Johnson</td>
<td>The relationship between transformational and transactional leadership styles and innovation commitment and output at commercial software companies</td>
<td>The Business Review, Cambridge</td>
</tr>
<tr>
<td>14</td>
<td>2013</td>
<td>Nusair</td>
<td>The role of climate for innovation in job performance: Empirical evidence from commercial banks in Jordan</td>
<td>International Journal of Business and Social Science</td>
</tr>
</tbody>
</table>

Source: Authors’ own work
Research paradigm

None of the 14 articles examined explicitly report on the research paradigm adopted for the study. The general theme that emerges from the articles is that leadership style and organisational climate somehow influence innovation in the organisation, and, in turn, innovativeness leads to superior organisational performance. Therefore, it may be argued that the only paradigm that fits these studies is the epistemology of the positivist paradigm.

Research design

All 14 articles report on empirical studies. Eleven studies (Articles 2, 3, 6, 7, 8, 9, 10, 11, 12, 13 and 14) adopted a pure quantitative research design approach, whereas the other 3 studies (Articles 1, 4 and 5) adopted a mixed method (qualitative and quantitative) research design approach. For the mixed method studies, researchers used interviews to gather information from key informants to develop constructs for survey questionnaires that were later used to gather quantitative data.

Sampling

Of the 14 articles analysed, 5 (Articles 4, 5, 10, 13 and 14) explicitly mention that random sampling was used to select the organisations investigated. Four studies (Articles 2, 3, 8 and 11) used purposive sampling and in Article 7 convenience sampling was used. In Articles 1 and 6 the sampling methods were not clearly specified. Articles 9 and 12 used the entire population. The sample size used in the articles is presented in Table 2, divided into three main aspects, namely, the number of companies used in the sample, the target sample and the final sample used.

Validity and reliability

Twelve (Articles 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 and 13) of the 14 studies were tested for validity and reliability of the measures they used, whereas the other 2 studies (Articles 12 and 14) reused the existing questionnaires that were previously tested for reliability and validity. It was interesting to note that the debate around what an appropriate level of Cronbach’s Alpha should be is ongoing, although Cronbach’s Alpha of greater than 0.6 was acceptable. To test reliability, the majority of authors (Articles 1, 2, 3, 4, 5, 6, 7, 8, 11 and 13) preferred to use the minimum cut-off of 0.7 as acceptable. With regard to validity, authors reported on discriminant validity (Articles 1, 2, 4, 5, 6, 8, 9 and 10), convergent validity (Articles 3, 4, 5, 7, 9 and 10), construct validity (Article A2) and face validity (Article 10). Other authors (Articles 12 and 13) conducted a pilot study to test the validity of the instruments used. Article 14 did not report on the validity of the instruments used.

Measurements

The techniques used to measure leadership style, organisational climate, innovation and organisational performance in the articles that met the inclusion criteria, are presented below.

Leadership style

To measure leadership style the authors of three Articles (4, 5 and 13) used a scale developed by Podsakoff, MacKenzie and Bommer (1996). Articles 1 and 12 used a MLQ (Multifactor Leadership Questionnaire) developed by Bass and Avolio (1990). In Article 1 the original version of the MLQ was used, whereas in Article 12 a later version of the MLQ was used (Avolio & Bass 2004). In Article 6 the scale developed by Wang and Ahmed (2004) was used, and in Article 8 the scale developed by Podsakoff et al. (1990) was used. In Article 10 the scale developed by Carless, Wearing and Mann (2000) was used. In other studies (Articles 2, 3, 7, 9, 11 and 14), leadership style was not included as part of the constructs or variables under investigation.

Organisational climate

Five studies (Articles 2, 3, 9, 11 and 14) adopted existing instruments. Articles 3 and 9 used the scale developed by Amabile et al. (1996), Article 2 used the scale developed by Frese et al. (1997), Article 11 adopted the scale developed by Victor and Cullen (1988), whilst Article 14 opted for the scale developed by Panuwatwanich et al. (2008). The authors of Articles 7 and 8 developed their own instrument to measure organisational climate. Other studies (Articles 1, 4, 5, 6, 10, 12 and 13) did not include organisational climate as a construct or as a variable.

Innovation

Two of the 14 studies (Articles 4 and 13) used the scale developed by Miller and Friesen (1983) to measure innovation. Article 1 used the scale developed by Siegel and Kaemmerer (1978), Article 3 used the scale developed by Knowles, Hansen and Shook (2008), Article 6 used the scale developed by Wang and Ahmed (2004) and Article 9 used the instrument developed by Crespell and Hansen (2008). The studies in Articles 10 and 11 used the scale developed by Srinivasan, Lilien and Rangaswamy (2002) and Delery and Doty (1996), respectively. Interestingly, in five studies

<table>
<thead>
<tr>
<th>Article</th>
<th>No. of companies</th>
<th>Target</th>
<th>Sample</th>
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<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>78</td>
<td>78</td>
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<tr>
<td>2</td>
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<td>3</td>
<td>1453</td>
<td>1453</td>
<td>219</td>
</tr>
<tr>
<td>4</td>
<td>N/A</td>
<td>900</td>
<td>408</td>
</tr>
<tr>
<td>5</td>
<td>164</td>
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<tr>
<td>14</td>
<td>5</td>
<td>200</td>
<td>200</td>
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</tbody>
</table>

Source: Authors’ own work
(Articles 2, 5, 7, 8 and 12) authors opted to develop their own custom measures of innovation.

**Organisational performance**

Four of the 14 studies (Articles 6, 10, 13 and 14) used existing scales. In Article 13 the scale developed by Cho, Ozment and Sink (2008) was used, and in Article 6 the scale developed by Churchill and Peters (1984) was used. In Article 10 the authors opted to use a measure of operational performance (developed by Zelbst, Green & Sower 2010) as well as a measure of financial performance (developed by Inman et al. 2011). In Article 14 the tool suggested by Pushpakumari (2008) was used, whilst other authors (Articles 1, 2, 3, 4, 5, 7, 8, 9, 11 and 12) developed their own measures of organisational performance. Although the majority of authors (Articles 1, 2, 3, 4, 7, 9, 10, 11 and 12) used financial indicators to assess organisational performance, almost all studies used subjective measures (self-reporting) to assess financial performance. In two studies, namely in Articles 10 and 11, the researchers opted to use both subjective and objective measures. Two studies (Articles 8 and 14) used non-financial measures as a sole measure whereas three studies (Articles 5, 6 and 13) opted to assess both financial and non-financial measures.

**Data analysis and interpretation**

The most common analysis technique used is Structural Equation Modelling (SEM). Six of the 14 studies (Articles 3, 6, 7, 9, 10 and 13) analysed used SEM, followed by the Partial Least Squares (PLS) multivariate analysis technique (Articles 1 and 11), confirmatory factor analysis (Articles 8 and 12) and recursive non-structured modelling (Articles 4 and 5). Other studies (Articles 2 and 14) used correlation analysis and regression respectively. In SEM, indices such as the Goodness of Fit index (GFI), Adjusted Goodness of Fit (AGFI), Normal Fit Index (NFI), Non-Normal Fit Index (NNFI), Comparative Fit Index (CFI), Root Mean Squared Error of Approximation (RMSEA) and the Standardised Root Mean Squared Residual (SRMR) were reported as being acceptable for the model. With regard to the correlation coefficient, a statistical significance of 0.05 (Articles 2, 3, 4, 6, 8, 9, 11, 12, 13 and 14), 0.01 (Articles 1, 2, 3, 5, 7, 8, 9, 11 and 13) or 0.001 (Articles 4, 7 and 10) was considered to be sufficient.

**Limitations**

Several limitations were highlighted in all the articles analysed. The limitation mentioned most frequently was the use of cross-sectional design (Articles 3, 4, 5, 7, 9, 10 and 13), as a cross-sectional analysis does not provide inference on causality. In Article 4 specific reference was made about the time-lag of innovation, which was not properly factored in. Others also referred to the time interval between innovation and measuring organisational performance (Articles 3, 6, 7, 9, 10 and 12).

The use of self-reporting (Articles 2, 4, 5, 7 and 13), which may be subject to social desirability bias, is seen as a limitation by some. Linked to this is the lack of multiple observations to supplement the survey data (Article 1) and collecting all instruments data from the same source (Articles 4, 5 and 8) (from managers [Article 3], for example).

Some also mention that the focus on the measurement is limited. In Article 4 the concern is that only a few economic sectors (e.g., food, manufacturing, construction and services) were investigated, and in Article 14 the absence of related studies per se is deemed to be a limitation. Others were concerned that only certain elements of leadership were evaluated and other factors were excluded (Articles 1 and 6).

On a similar note the use of a one-dimensional perspective of organisation performance, rather than a multi-dimensional perspective (financial, operational and organisational effectiveness) is criticised (Articles 3 and 4).

Lastly, Article 5 states that the use of subjective measures of financial performance is a key limitation and suggests that objective measures such as sales growth and earnings per share, amongst others that are assumed to reflect the fulfilment of the firm’s economic goal, should be considered for future research.

**Ethical considerations**

Only four (Articles 8, 9, 11 and 14) of the 14 articles analysed explicitly mention how possible ethical issues were addressed. The ethical considerations incorporated by the four articles include requesting permission from the employer to conduct the study in the organisation (Articles 8 and 9), explaining the purpose of the study to participants, allowing them to participate voluntarily (Articles 11 and 14) and assuring participants that the data that they provide will remain anonymous and no names will be reflected on any of the instruments (Articles 11 and 14). Generally, it seems that journal editors are not concerned about ethical requirements (Articles 1, 2, 3, 4, 5, 6, 7, 10, 12 and 13) in investigating these phenomena.

**Discussion**

The aim of the study was to analyse the methodology used to investigate the relationship between leadership style, organisational climate, innovation and organisational performance using the methodology framework (research paradigm, research design, sampling, measurements, validity and reliability, data collection, data analysis and interpretation, limitations and ethical considerations) identified in the literature review.

In assessing the 14 articles retrieved it was found that the research paradigm is not explicitly reported on. This may reflect indifference or it may be because journal editors in the field are not concerned about explicitly reporting on this. The dominant paradigm used, as deduced through an analysis of the 14 articles, is a positivist paradigm.

In assessing the research design, it can be concluded that most scholars prefer to use the quantitative research design,
although others opt to supplement the quantitative method with the qualitative research design. None of the studies used a pure qualitative research design. The design of the research was thus reflective of the paradigm.

Random sampling is the most popular sampling technique used, followed by the purposive sampling technique, which in turn complements the quantitative research design and the nature of the study. However, authors appear to pay little attention to defining the population or stipulating how samples were extracted. The average sample size is approximately 176, excluding outliers. The unit of analysis included mainly organisations, although some studies use business units within one organisation.

In general, authors are diligent in reporting on the reliability and validity of the instruments used, except for two articles which are silent on validity. All studies are explicit about the measuring instruments used.

The most common measurement used for leadership style is a scale developed by Podsakoff et al. (1996) followed by the MLQ instrument. However, it is worth mentioning that the scale developed by Podsakoff et al. (1996) focuses primarily on transformational leadership style, whereas the MLQ is designed to measure various leadership styles, including both transformational and transactional leadership styles. Only two studies that assessed both transformational and transactional leadership styles used the MLQ instrument, and five studies focused exclusively on transformational leadership style. In these cases it is thus about the role of transformational leadership rather than about leadership styles.

With regard to the measurement of organisational climate, innovation and organisational performance, no commonly preferred measurement scale exists amongst scholars. Scholars choose or develop the measuring instruments based on their preferred definitions of these concepts. The absence of a standardised method of assessing climate, innovation and organisational performance makes it difficult to replicate studies or build on existing knowledge. Worth noting is that none of the studies differentiated between radical and incremental innovation, and very few studies used both financial and non-financial measures to assess organisational performance. Most studies focus on financial aspects of organisational performance. Only one study uses an objective measure of financial performance.

Structural equation modelling (SEM) is by far the most preferred analysis technique amongst scholars, although other scholars opt for the Partial Least Squares (PLS) multivariate analysis technique, confirmatory factor analysis, recursive non-saturated model and regression and correlation analysis.

Various limitations are highlighted, but the most common and, perhaps, the most important limitations are the use of a cross-sectional design, which provides for the study of a relationship between constructs but prevents the inference on causality, followed by time intervals when measuring organisational performance and the use of self-reporting techniques to gather data. The use of subjective measures of organisational performance is also mentioned as a serious limitation.

It is interesting to note that few articles explicitly mention the way in which ethical issues were managed. This may be typical of research in the domain of finance, but should also be considered in this type of research where human subjects are requested to provide information on matters such as leadership style, organisational climate and innovation.

Conclusion and recommendation

This research reports on the prevailing methods of conducting research on the relationship between leadership style, organisational climate, innovation and organisational performance. Only study 8 (Charbonnier-Voirin et al. 2010), identified in the search, investigated the relationship between all four constructs. Most of the identified studies investigated the relationship between leadership style, innovation and organisational performance, whilst others examined the relationship between organisational climate, innovation and organisational performance.

Most of the studies analysed do not, in many respects, meet the standard methodological protocols as set out in the literature. Most evident is the lack of sufficient articulation on research paradigms used, adequate reporting on the nature of the population and sampling methodology, absence of uniform measures of climate, innovation and, particularly, organisational performance. Few guidelines exist on decision-making strategies related to reported statistical results and limited acknowledgement of ethical matters. Notwithstanding, this study is valuable as it clearly sets out the customs in this area.

Researchers are urged to acknowledge the different elements of a comprehensive methodology section and apply this to their research. This will assist readers to judge the value of the research process and contribute to systematically building the body of knowledge in this field. It is important for researchers to note that the method section is the most important part of a research paper because it provides the information that the reader needs to judge the validity of the study. Therefore, providing a clear and precise description of each method subsection is a crucial aspect of scientific writing. In the same token, researchers are also urged to take cognisance of the impact of limitations of previous studies on future studies.

Implication for practice and direction for future research

Although the findings indicate that none of the studies analysed exhibit severe problems, there are many issues that need to be addressed in future research. Firstly, although
cross-sectional studies often produce results that can be generalised to all industries, sometimes the results of those studies can be misleading because such studies average the results across multiple industries and sectors: this can lead to a conclusion that is misleading. Therefore, there is a need for future studies to put more focus on specific industries and sectors.

Secondly, cross-sectional studies are by nature based on a predetermined time frame. In this regard, a longitudinal study is suggested to overcome limitations presented by cross-sectional studies.

Thirdly, in order to be more comprehensive, future research should also consider differentiating between radical and incremental innovation and explore the possibility of using both financial and non-financial measures to assess organisational performance. For studies that focus exclusively on financial measures of organisational performance, the use of objective measures is recommended.

Limitations
Although the systematic literature review was conducted in a disciplined manner, this study has limitations. Firstly, the review uses only two databases, albeit the most recognised databases of record: EBSCOhost and ProQuest. These databases may have omitted some relevant studies. Secondly, the search process was limited to indexed journals available which were peer-reviewed and written in the English language. It is not known whether the results of this article would have been different if non-indexed journals or dissertations and work published in other languages had been included in the search.

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